

PUB-NO: WO009966540A2

DOCUMENT-IDENTIFIER: WO 9966540 A2

TITLE: INTEGRATED INORGANIC/ORGANIC COMPLEMENTARY
THIN-FILM
TRANSISTOR CIRCUIT

PUBN-DATE: December 23, 1999

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APPL-NO: NO09900208

APPL-DATE: June 18, 1999

PRIORITY-DATA: NO00985729A (December 8, 1998) , US08983098P (June 19, 1998)

INT-CL (IPC): H01L00/

EUR-CL (EPC): H01L021/336 ; H01L021/84, H01L027/12 , H01L027/28 ,
H01L029/786
, H01L051/20

US-CL-CURRENT: 257/E21.414, 257/E21.703 , 257/E27.111 , 257/E29.291

ABSTRACT:

CHG DATE=20031112 STATUS=O>An integrated organic/inorganic complementary thin-film transistor circuit comprises a first and a second transistor which are operatively connected on a common substrate, wherein the first transistor is an inorganic thin-film transistor and the second an organic thin-film transistor. The inorganic thin-film transistor is an n-channel transistor and the organic thin-film transistor is a p-channel transistor or vice versa. Each of the transistors has a separate gate electrode and the organic active semiconductor material is in the case of a p-channel semiconductor in the organic thin-film transistor electrically isolated from the inorganic thin-film transistor. In a first method for fabricating a transistor circuit of this kind separate gate electrodes are deposited for each transistor on a common substrate, the material for the source and the drain electrode of the organic thin-film transistor are deposited on the same layer level in the thin-film structure of the organic thin-film transistor and in each case the organic active semiconductor material in an organic p-channel transistor is provided electrically isolated from the inorganic n-channel transistor, and the organic active semiconductor material in an organic n-channel transistor optionally electrically isolated from the inorganic p-channel transistor. In a more specific method for fabricating a complementary transistor circuit the inorganic active semiconductor is deposited in the form of hydrogenated amorphous silicon and an n<+> doped layer of a silicon material is deposited as respectively source and drain areas in the organic transistor. A layer of pentacene is deposited over an isolated layer which is patterned such that the pentacene which forms the active semiconductor in the organic thin-film transistor is isolated electrically from the inorganic thin-film

transistor.